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Sincola (Sinaxila) isabelae nov. sp., the last representative of the genus in the Caribbean

Bernard Landau

KEY WORDS: Mollusca, Gastropoda, Columbellidae, *Sincola*, new species, Pleistocene, La Isabela Formation, Dominican Republic.

ABSTRACT This paper describes a new species of *Sincola* Olsson & Harbison, 1953, subgenus *Sinaxila* Jung, 1989 (family Columbellidae: Strombina-group) from the early Pleistocene Isabela Formation at La Isabela near Luperón, northern Dominican Republic. This is the first record of an extinct species occurring in the formation and the last representative of the genus in the Caribbean.

RIASSUNTO Questa pubblicazione descrive una nuova specie di *Sincola* Olsson & Harbison, 1953, sottogenere *Sinaxila* Jung, 1989 (famiglia Columbellidae, gruppo Strombina) del Pleistocene inferiore nella Isabela Formation a La Isabela vicino a Luperón, nella Repubblica Dominicana. Questo è il primo rinvenimento di una specie estinta presente nella formazione e l'ultimo rappresentante del genere nei Caraibi.

B. LANDAU, International Health Centres, Avenida Infante de Henrique 7, Areias São João, 8200 Albufeira, Portugal.

INTRODUCTION

The type section of the Isabela Formation, described by MARCANO & TAVARES (1982), lies on the road linking La Isabela with the Bajabonico River, about two kilometres south of the plaque commemorating the first settlement by Christopher Columbus in the Americas. The type section has, unfortunately, now all but disappeared due to road construction and the material described in this paper was collected from a small coastal cliff, two to three meters high, and approximately 300 metres northeast of the type section.

The beach section consists of numerous reef corals in a creamy-yellow, powdery limestone matrix containing an abundant mollusc fauna in a perfect state of preservation and fragments of echinoids.

MARCANO & TAVARES (1982, p. 17) date the Isabela Formation as early Pleistocene, based on a comparison of the fauna with that from the Pleistocene of Cuba, the two faunas having 31 species of molluscs in common. Although four species of bivalves no longer live off Recent Dominican waters, none of the 161 species of molluscs listed by the authors are extinct. The fauna is certainly of a much more recent nature than that found in the Moin Formation of Costa Rica, which straddles the Plio/Pleistocene boundary (MCNEILL *et al.*, 2000). The latter contains at least 80 extinct species, about 15% of the total (ROBINSON 1991; author's personal collection). There are no genera such as *Jenneria*, or species such as *Distorsio decussata decussata* (Valenciennes, 1832) today restricted to the Pacific, both of which occur in the Moin Formation. Based on the molluscan assemblage a more recent dating is probable.

SYSTEMATIC PALAEONTOLOGY

Superfamily	Buccinoidea Rafinesque, 1815
Family	Columbellidae Swainson, 1840
Subfamily	Pyreninae Suter, 1913
Genus	*Sincola* Olsson & Harbison, 1953
Subgenus	*Sinaxila* Jung, 1989

Sincola (Sinaxila) isabelae nov. sp.
Plate 1, figures 1a-c

Derivatio nominis: named after the locality where this species is found.

Holotype: Naturhistorisches Museum Basel H 18262. Height 7.3 mm, width 3.5 mm.

Early Pleistocene, La Isabela Formation, Coastal section approximately 300 meters northeast of the type section of the Isabela Formation (MARCANO & TAVARES, 1982, map).

Paratype: Naturhistorisches Museum Basel H 18263. Height 7.2 mm, width 3.5 mm.

Early Pleistocene, La Isabela Formation, Coastal section approximately 300 meters northeast of the type section of the Isabela Formation (MARCANO & TAVARES, 1982, map).

24 additional paratypes are in the B. Landau collection.

Diagnosis: A small *Sincola (Sinaxila)* with a mean height of 6.9 mm, a paucispiral protoconch, prominent axial sculpture extending from suture to suture, spiral sculpture restricted to grooves on the base of the body whorl and dorsal hump not developed.

Description: Small (mean height 6.9 mm, range 6.2-7.3 mm), moderately slender shell. Protoconch smooth, 1¾ volutions; outer lip sinusigerous. Teleoconch 4 to 5 whorls, straight to slightly convex; axial sculpture prominent. Axial ribs straight to slightly prosocline, extending from suture to suture. Early spire whorls 12 to 16 axial ribs, increasing to 16 to 18 on the penultimate whorl. Axial ribs absent on last half of body whorl. Dorsal hump not developed. Base of body whorl sculptured by spiral grooves, weakening adapically. Upper part of body whorl

usually smooth, sometimes with a few spiral groves below the suture, central portion of the body whorl always smooth. Outer lip thickened, somewhat extended adapically; with 7 to 8 denticles, the second one from the top being more developed. Columellar callus well developed, with four relatively large denticles. Parietal callus thin, with a thickening bordering the short, posteriot canal. Anterior canal short, slightly recurved.

Remarks: *Sincola (Sinaxila) isabelae* nov. sp. is probably the last member of the genus in the Caribbean and extends the previously known age range of the subgenus *Sinaxila* from the Middle Pliocene to Pleistocene (JUNG, 1989, fig. 31). It is also the smallest member of the subgenus with a maximum height of 7.3 mm. No members of the genus survived into Recent times in the Caribbean.

When viewed under ultraviolet light the new species shows a colour band on the lower third of the spire whorls, adjacent to the suture. On the body whorl the spiral band lies a short distance below the suture.

Of the 26 specimens of *Sincola (S.) isabelae*, 15 have drill holes indicative of predation by naticid gastropods. This degree of heavy predation has been reported pteviously amongst othet members of the Strombina-group (HOUBRICK 1983, p. 353).

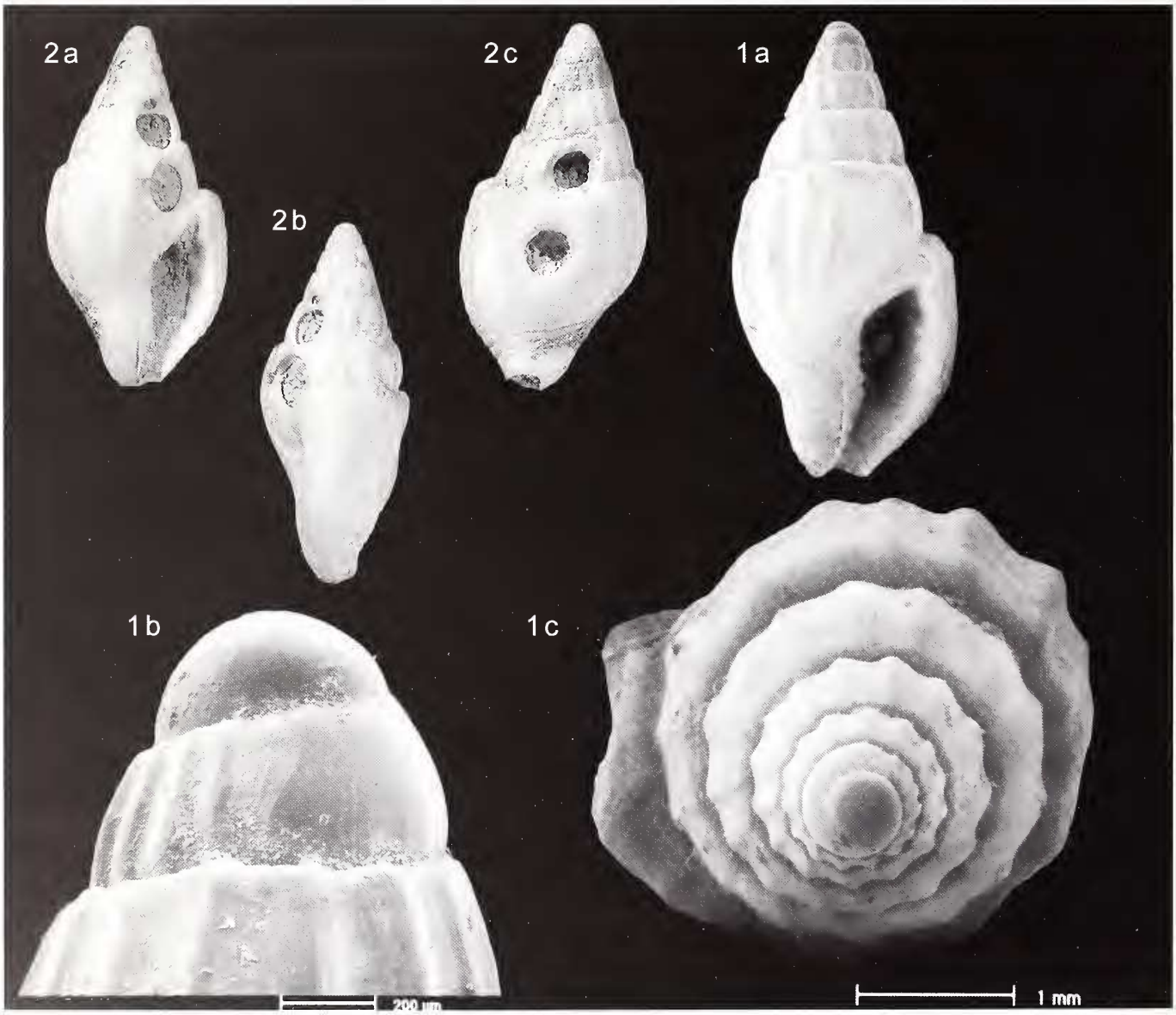

Fig. 1a-c. *Sincola (Sinaxila) isabela* nov. sp. Holotype: Naturhistorisches Museum Basel H 18262. Early Pleistocene, La Isabela Formation, Coastal section approximately 300 meters northeast of the type section of the Isabela Formation (MARCANO & TAVARES, 1982, map). Fig. 1a. Frontal view (S.E.M). Height, 6.4 mm. Fig. 1b. Protoconch with sinusigerous outer lip (S.E.M). Fig. 1c. Apical view of protoconch (S.E.M).

Fig. 2a-c. *Sincola (Sinaxila) isabela* nov. sp. Paratype: B. Landau coll.

Early Pleistocene, La Isabela Formation, Coastal section approximately 300 meters northeast of the type section of the Isabela Formation (MARCANO & TAVARES, 1982, map). Fig. 2a. Frontal view, height, 7.3 mm. Fig. 2b, side view. Fig 2c, back view.

Comparisons: The small, squat shape with strong apertural armour places the new species in the genus *Sincola*; the strong axial sculpture extending onto the body whorl, but not onto the dorsal side, is characteristic of the subgenus *Sinaxila*. The subgenus *Sinuina* Jung, 1989 has even stronger axial sculpture on the body whorl, extending onto the dorsal surface. The latter also has a conspicuous sinus on the outer lip, a little above mid-height, which seems the most characteristic feature of the subgenus, although this feature is not discussed in the original description (JUNG, 1989, p. 231).

Sincola (Sinaxila) bassi (Maury, 1917) from the late Miocene Cercado and Gurabo formations of the Dominican Republic is most similar to the new species, although slightly larger, with a more inflated body whorl and a stronger adapical extension of the outer lip. The Miocene species has a prominent spiral cord just below the suture, giving the body whorl a shouldered appearance, which is absent in *S. (S.) isabelae*. The protoconch of *S. (S.) bassi* is slightly larger, consisting of 2-2½ volutions.

Sincola (Sinaxila) gunteri (Mansfield, 1930) another small member of the subgenus from the middle Pliocene of Florida is more elongated, with a greater number of teleoconch whorls (6 *vs.* 4 -5). This shell has a broad subsutural cord, on which the axial ribs thickened to form blunt nodules, giving a slightly shouldered appearance to the spire whorls. The protoconch of the Floridian shell consists of 3 volutions as opposed to less than two in *S. (S.) isabelae*.

Sincola (Sinaxila) matima (Olsson, 1922) from the Rio Banano Formation of Costa Rica combines features of the previous two species: thickened axial ribs adapically as in *S. gunteri* and a spiral cord below the suture, similar to *S. bassi*, features which differentiate it from the new species. Again the protoconch is multispiral, a little over three volutions.

Sincola (Sinaxila) tumbeziana (Olsson, 1932) from the early Miocene Lower Zorritos Formation of Peru is not unlike *S. isabelae*, but is more elongated with straight-sided whorls forming a slightly coeloconoid spire. The former also has a smaller number of axial ribs on the later whorls (13-14 *vs.* 16-18).

Sincola (Sinaxila) cunninghamcraigi (Rutsch, 1942) from the early Pliocene Springvale Formation of Trinidad has no axial ribs on the body and a protoconch of 3½ whorls.

Sincola (Sinaxila) naufraga Jung, 1989, from the early Pliocene Bowden Formation of Jamaica has a similar protoconch, 1¾ volutions, but the teleoconch is quite unlike the new species, much stouter, with a shorter spire and more developed apertural armour.

The only other described species, *Sincola (Sinaxila) lloydsmithi* (Pilsbry & Brown, 1917) from the late Miocene or early Pliocene of Colombia is quite different, with strong axial and spiral sculpture.

JUNG (1989, p. 230-231) describes but does not name a species from the early Pliocene of Colombia. This differs from *S. isabelae* in being stouter with a moderately prominent dorsal hump giving the ventral side of the body whorl a somewhat flattened appearance.

Paleoecological considerations: The genus *Sincola* first appeared in the Caribbean in the Early Miocene, reaching a peak diversity of species in the Late Miocene. There was a marked extinction in the mid-Pliocene with only *Sincola (Sincola) crassilabrum* (Guppy, 1874) from the Matura shell bed of the Talparo Formation of Trinidad (JUNG, 1989, p. 24, fig. 27) and the new species *Sincola (Sinaxila) isabelae* surviving into the Pleistocene. This marked extinction of the Caribbean faunal province, following a prolonged period of steady increase in species diversity (JACKSON *et al.*, 1999), approximately coincides with the emergence of the Panama land bridge and possible surface seawater cooling in the Caribbean, resulting from an increased glaciation in the Northern Hemisphere (JACKSON & BUDD, 1996, p. 10).

Sincola (Sinaxila) isabelae, unlike most other species of the genus, has a paucispiral protoconch suggesting direct (or lecithotrophic) development (JACKSON *et al.*, 1996, p. 242). This would account for a high degree of endemism in many genera of molluscs, but does not seem to be associated with longevity or geographic range in the Strombina-group. Indeed, most *Sincola* have multispiral protoconchs suggesting planktotrophic larval development and yet are restricted to one time interval and one geographic region as defined by JACKSON, JUNG & FORTUNATO (1996). This is true of most members of the Strombina-group, which are narrowly distributed, with a restricted geographic range (JACKSON *et al.*, 1996, p. 240-241).

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